BROOKHAVEN NATIONAL LABORATORY

a passion for discovery

Remediating Groundwater at BNL

Review of Treatment Systems, Performance and Progress

Presentation to CAC
January 10, 2013

Managed for the U.S. Department of Energy
by Brookhaven Science Associates

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Groundwater Protection Group

Agenda

- Overview
- Cleanup Progress Highlights
- Treatment System/Plume Status Updates

Groundwater Status Report (Volume 2 of Site Environmental Report)

- Presentation summarizes highlights of 2011 Report
- Web link for report: http://www.bnl.gov/gpg/files/Annual_Reports/2011pdf/Main_text.pdf

Active Groundwater Treatment Systems/Plumes 2011

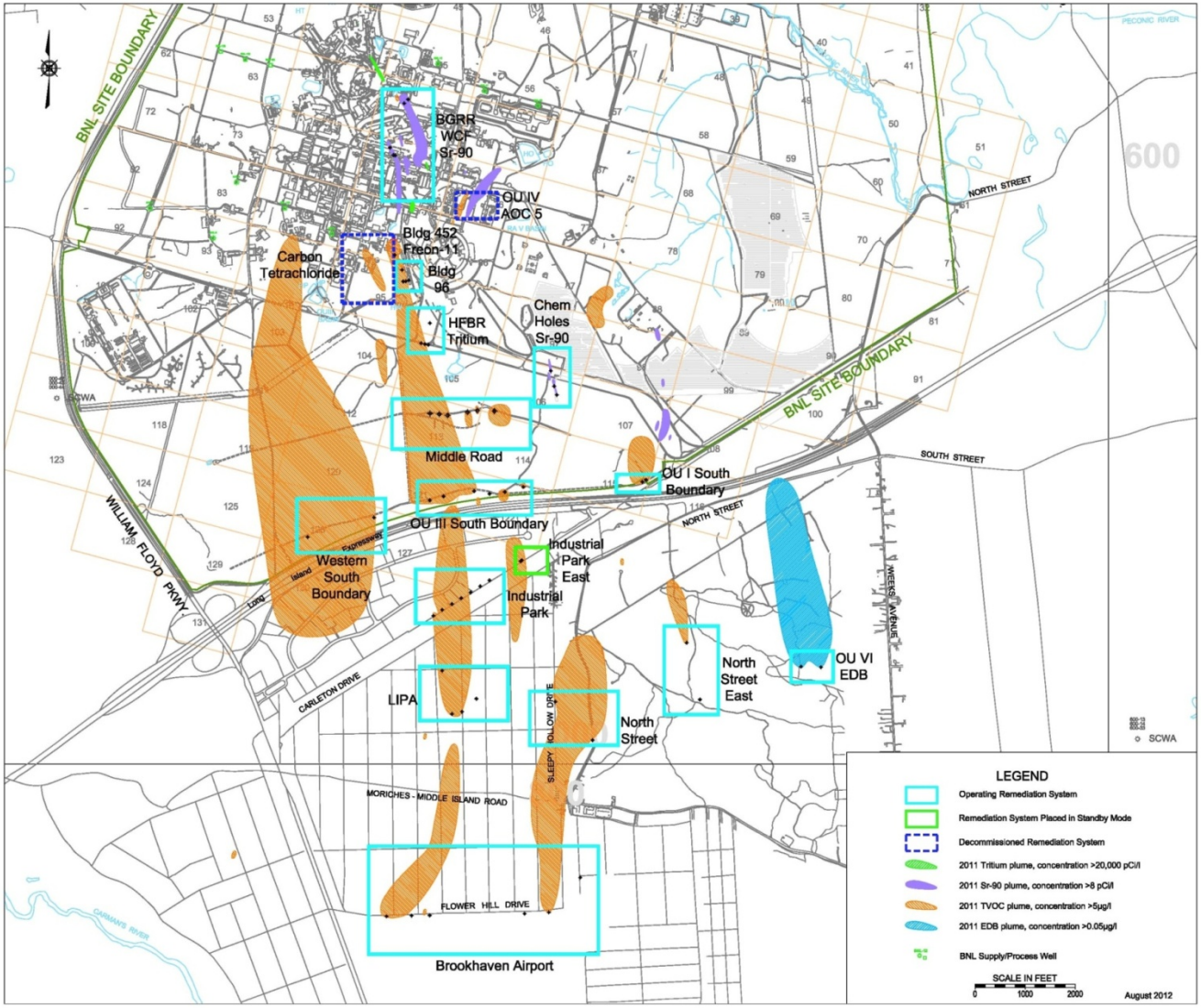
10 Volatile Organic Compound (VOC) Systems

2 Sr-90 Systems

1 Tritium Pump & Recharge System

1996 - 2011:

- **19 billion gallons of contaminated groundwater treated and recharged to the aquifer**
- **6,700 lbs VOCs removed**
- **25 mCi Sr-90 removed**



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Groundwater Treatment System Completion Process

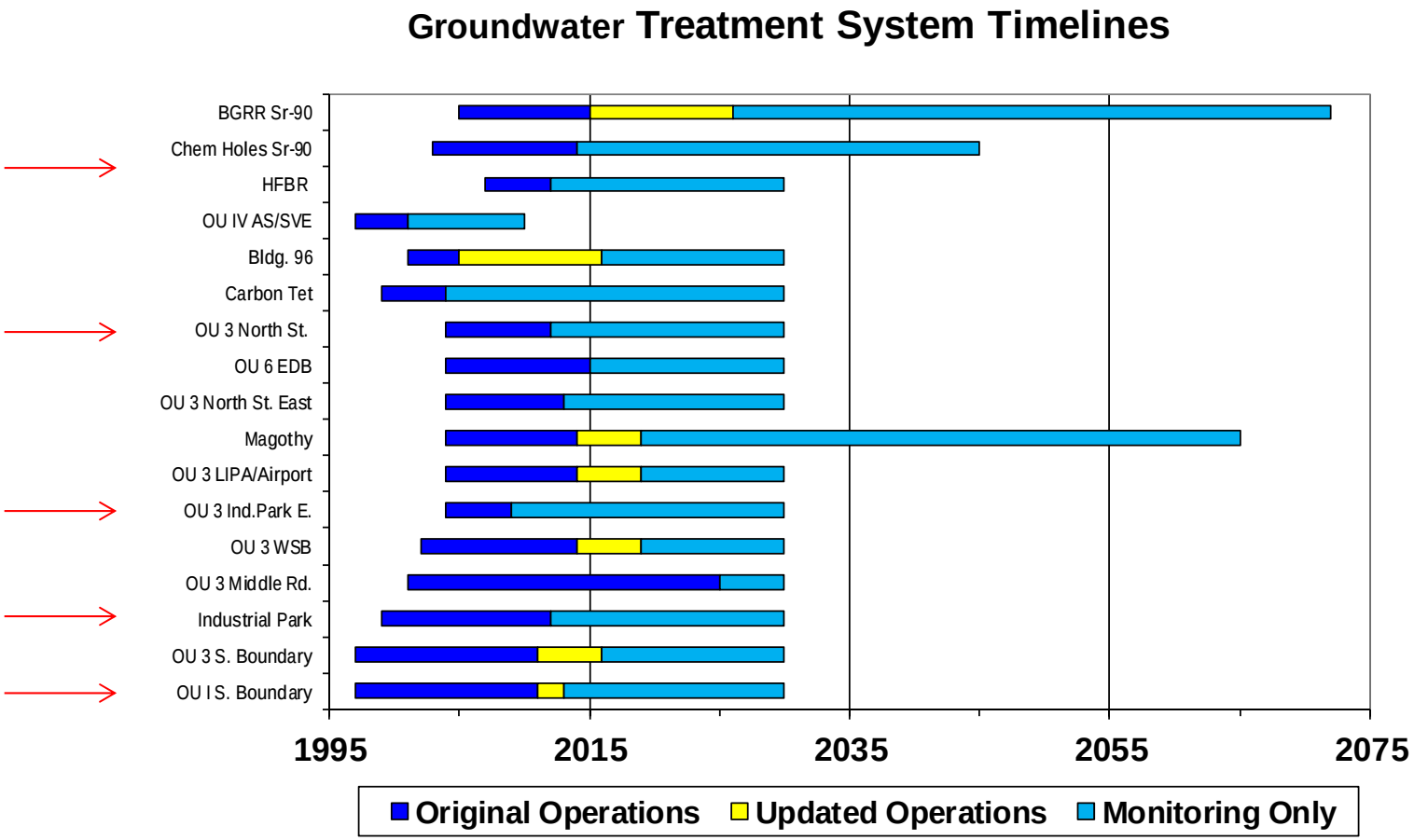
Achieve plume capture goal for system (typically < 50 µg/L Total VOC (TVOC) in monitoring and extraction wells)

Petition Regulators for system shutdown

Upon approval, turn extraction wells off and maintain in standby mode/sample wells for several years

If no rebound in VOC concentrations is observed, petition Regulators for system closure (Upon approval, decommission equipment, abandon wells, limited continued monitoring)

Groundwater Treatment System Status



Groundwater Cleanup Completion

System Closures:

- OU IV Air Sparge/Soil Vapor Extraction (2003)
- Carbon Tetrachloride Pump and Treat (2010)

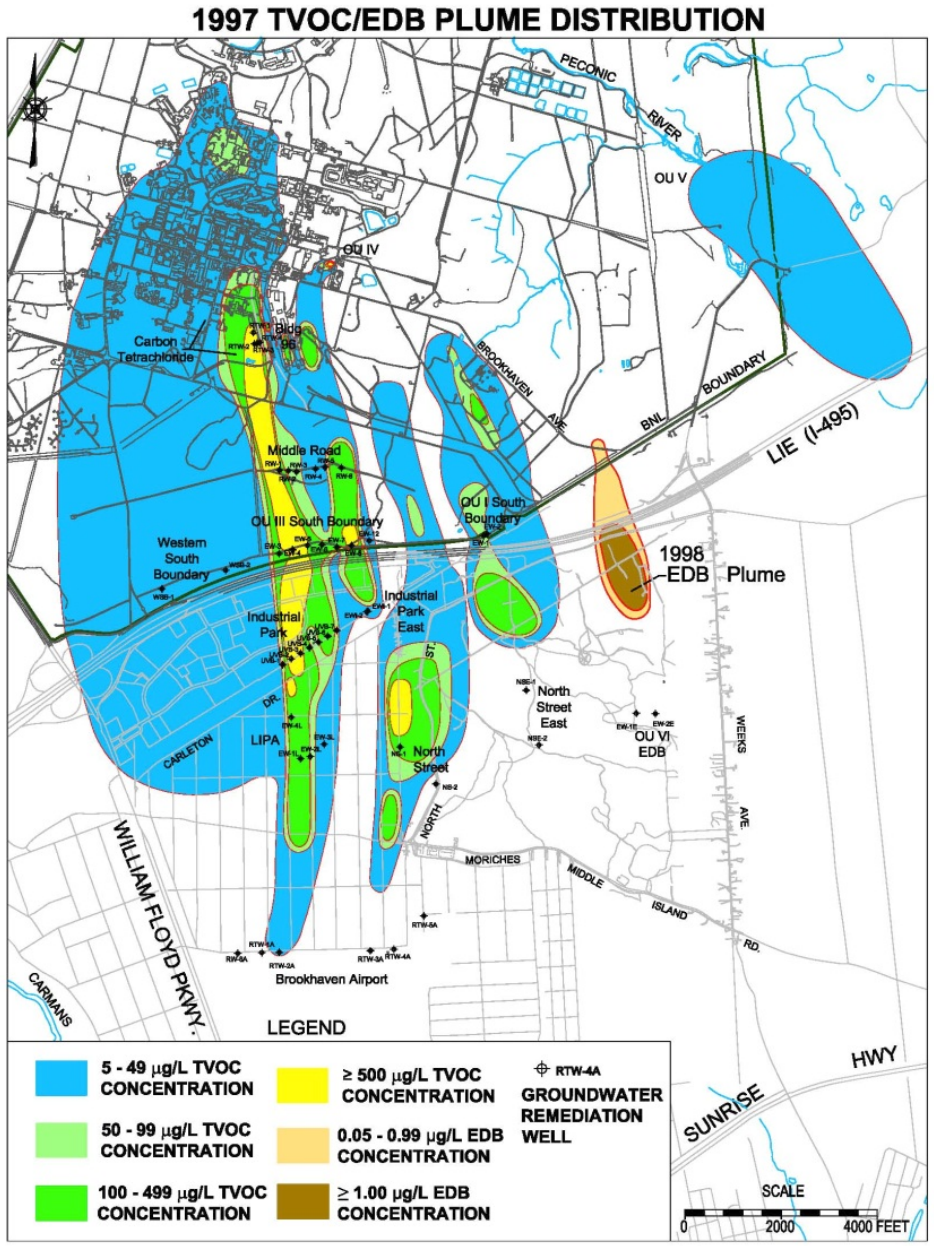
Systems in Shutdown Mode:

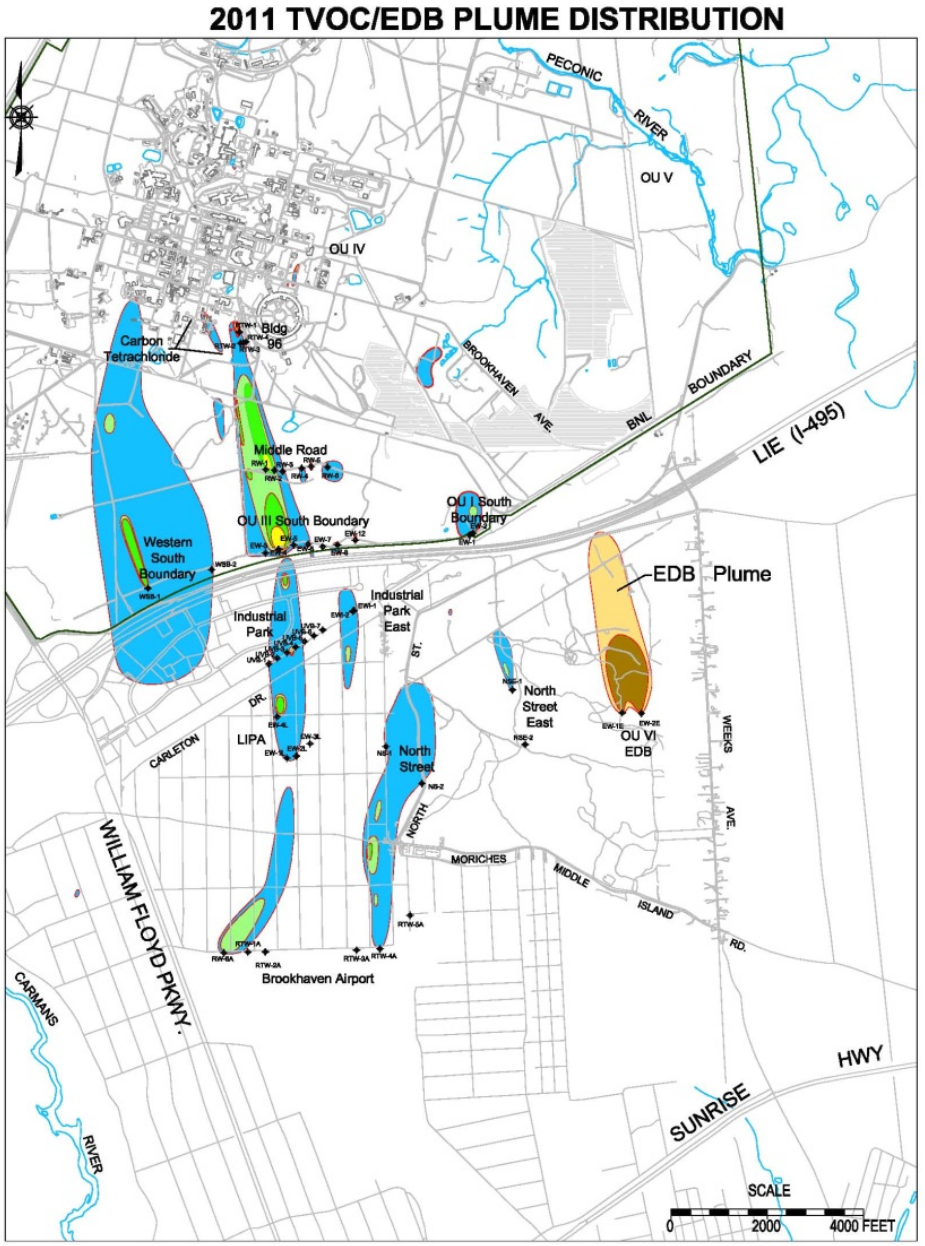
- Industrial Park East Pump and Treat

Discontinued Natural Attenuation Monitoring:

- OU V Sewage Treatment Plant VOC Plume (2012)

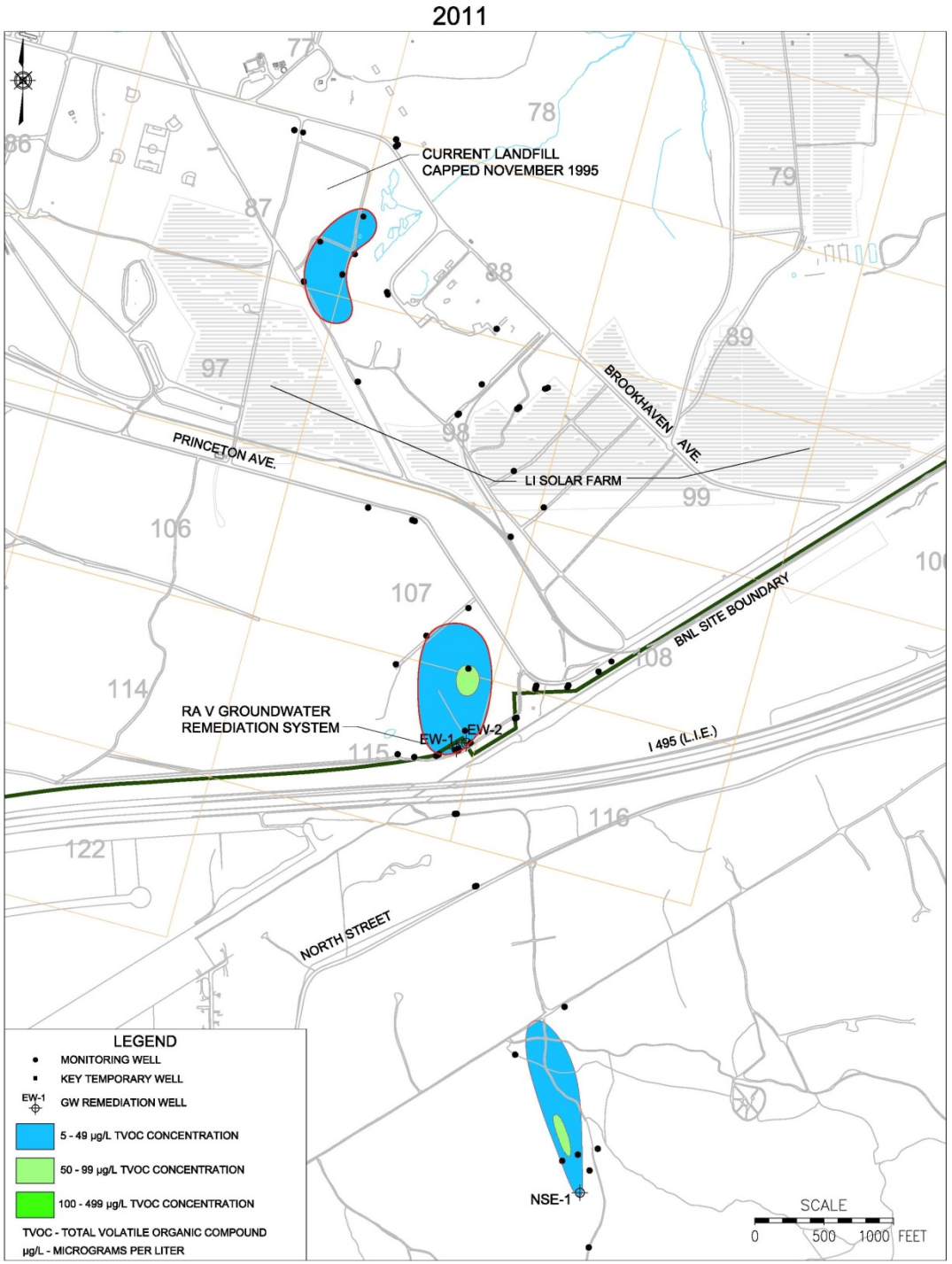
VOC Cleanup Progress





Cleanup Progress: OU I South Boundary

- System began operation in 1996
- 2 Extraction Wells – pulse pumping since July 2011
- Plan to petition for shutdown 2013



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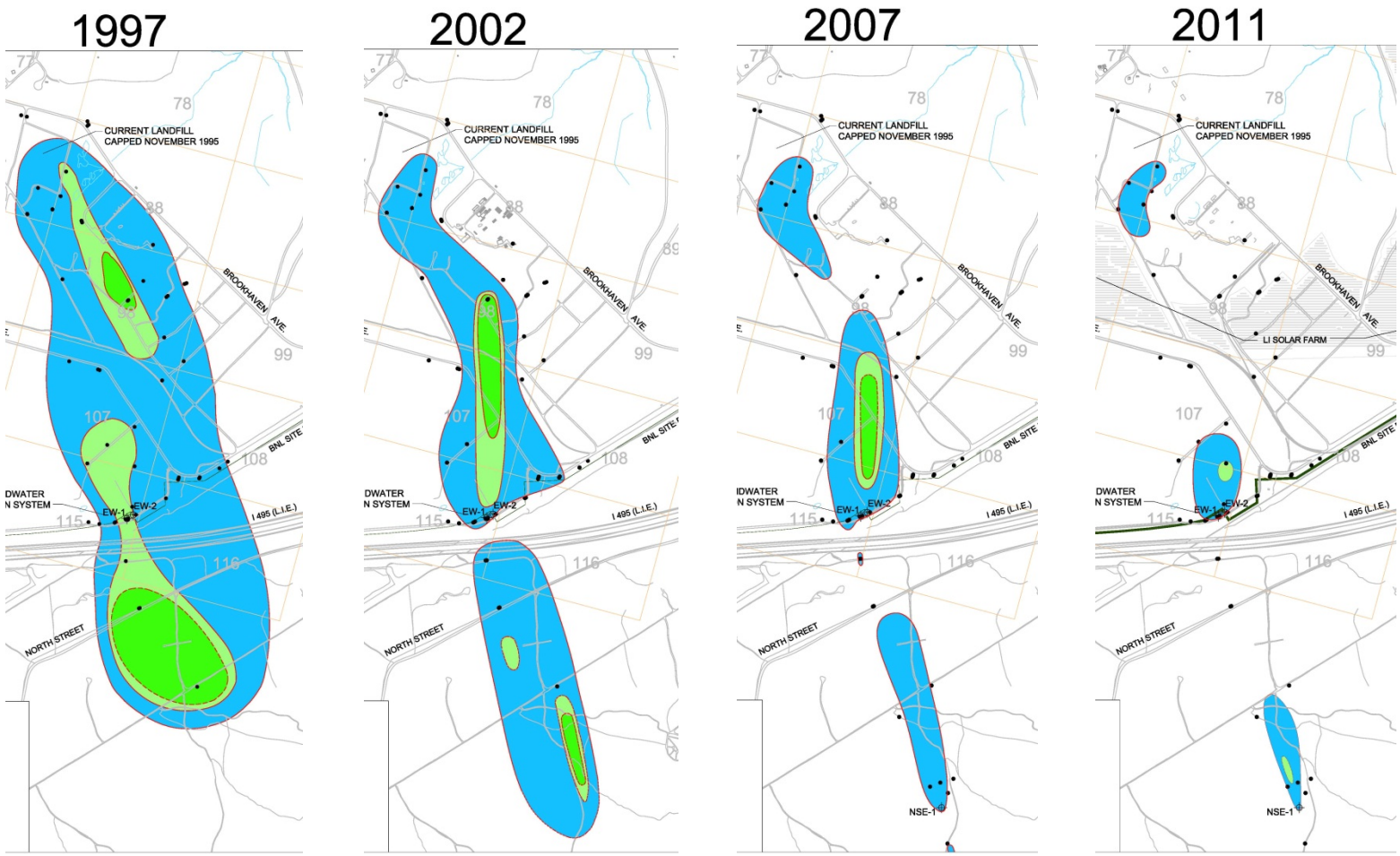
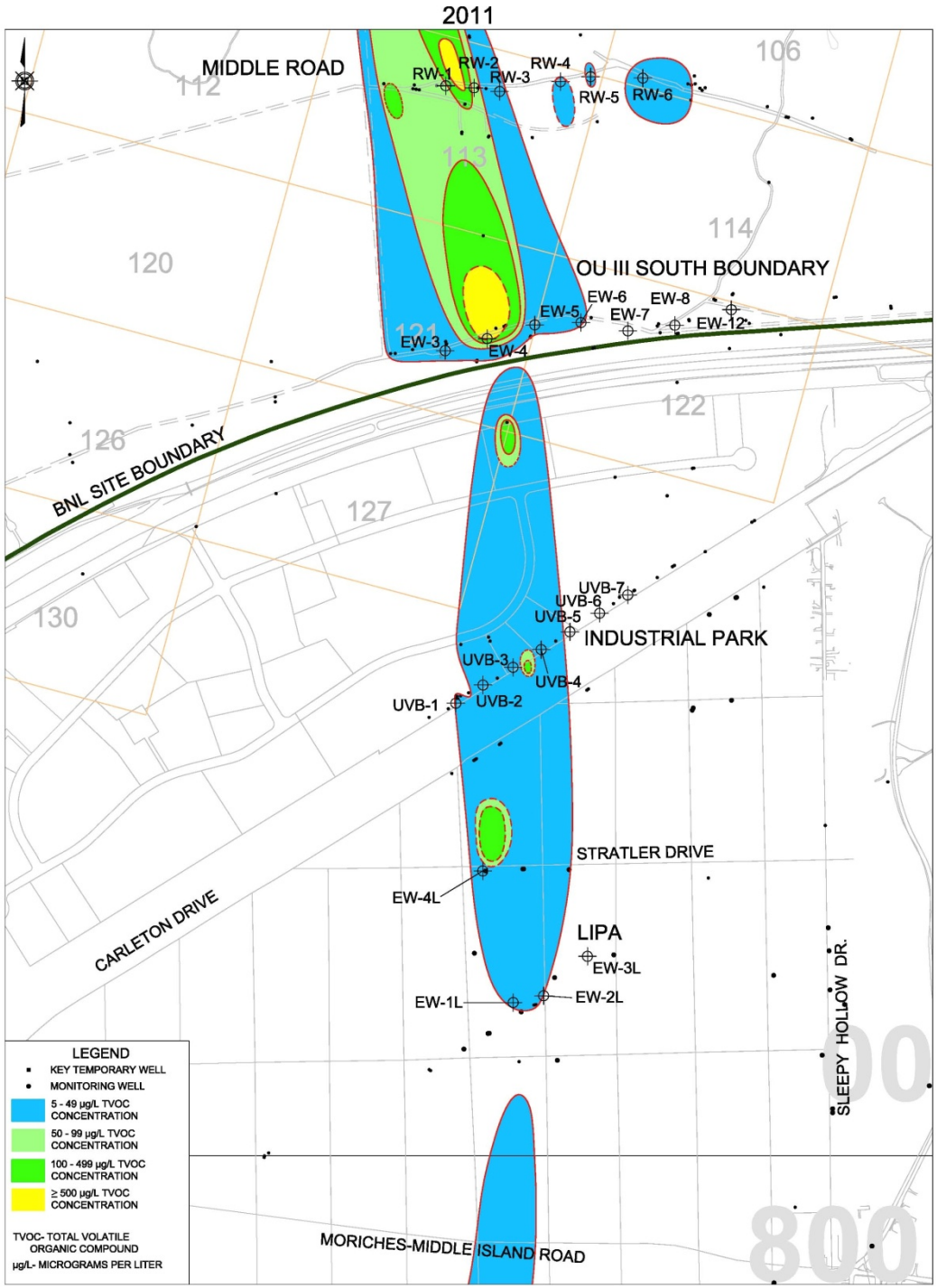
Treatment System Progress: OU I South Boundary

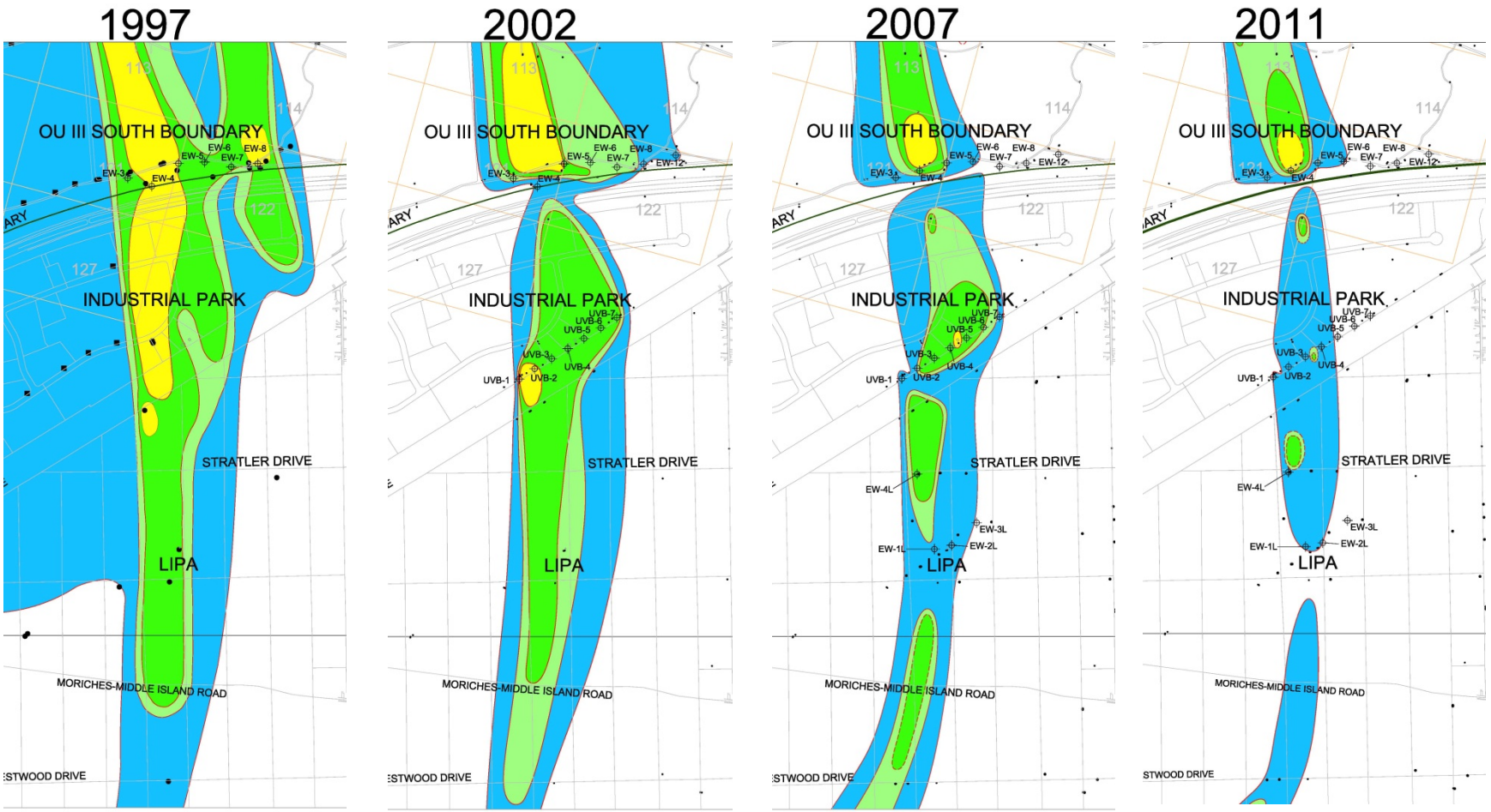


Cleanup Progress: OU III Industrial Park

- 7 in-well air stripping wells, began operation in 1999
- 3 wells currently in standby
- Plan to petition for shutdown 2013

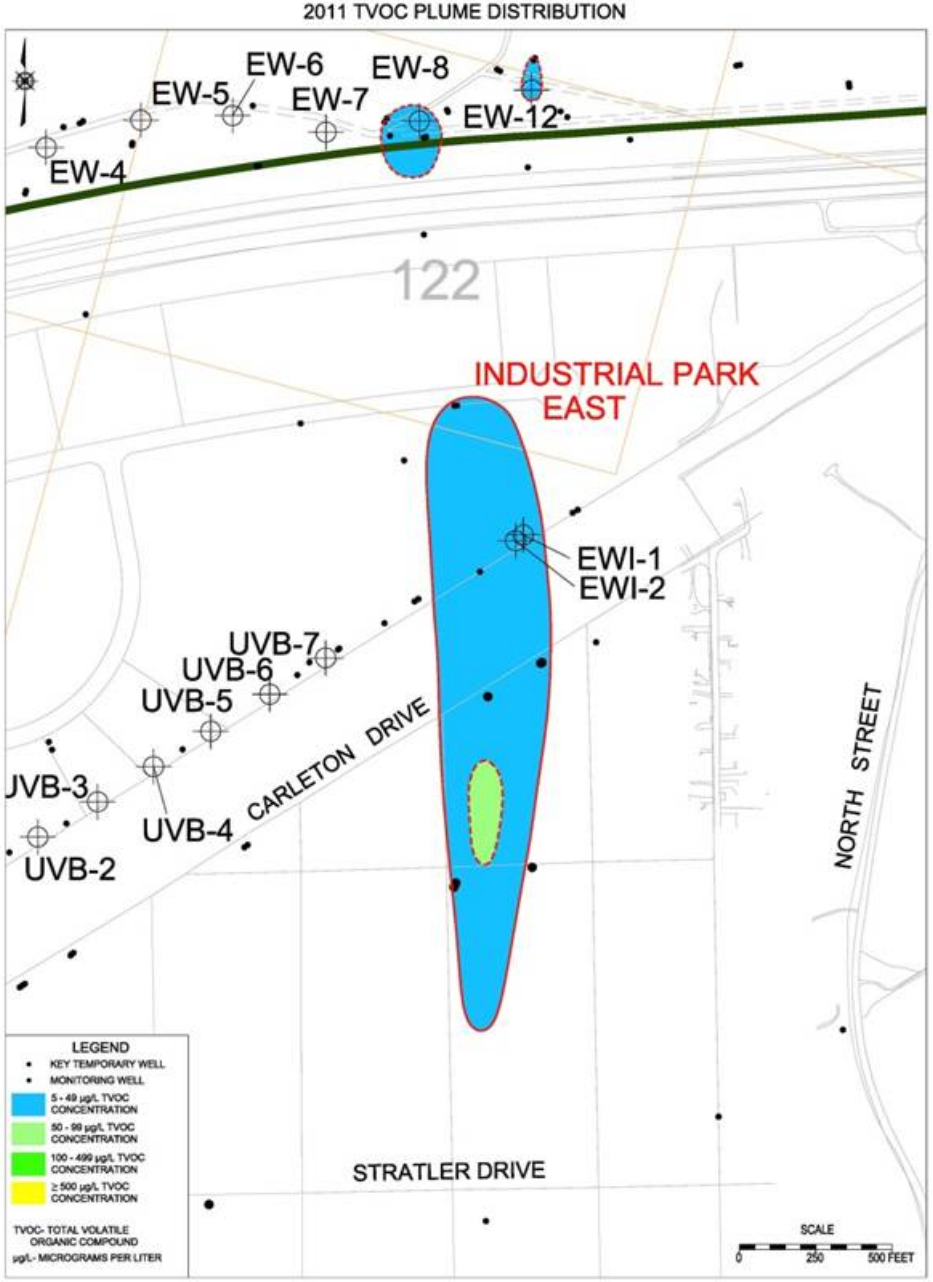


Treatment System Progress: Industrial Park



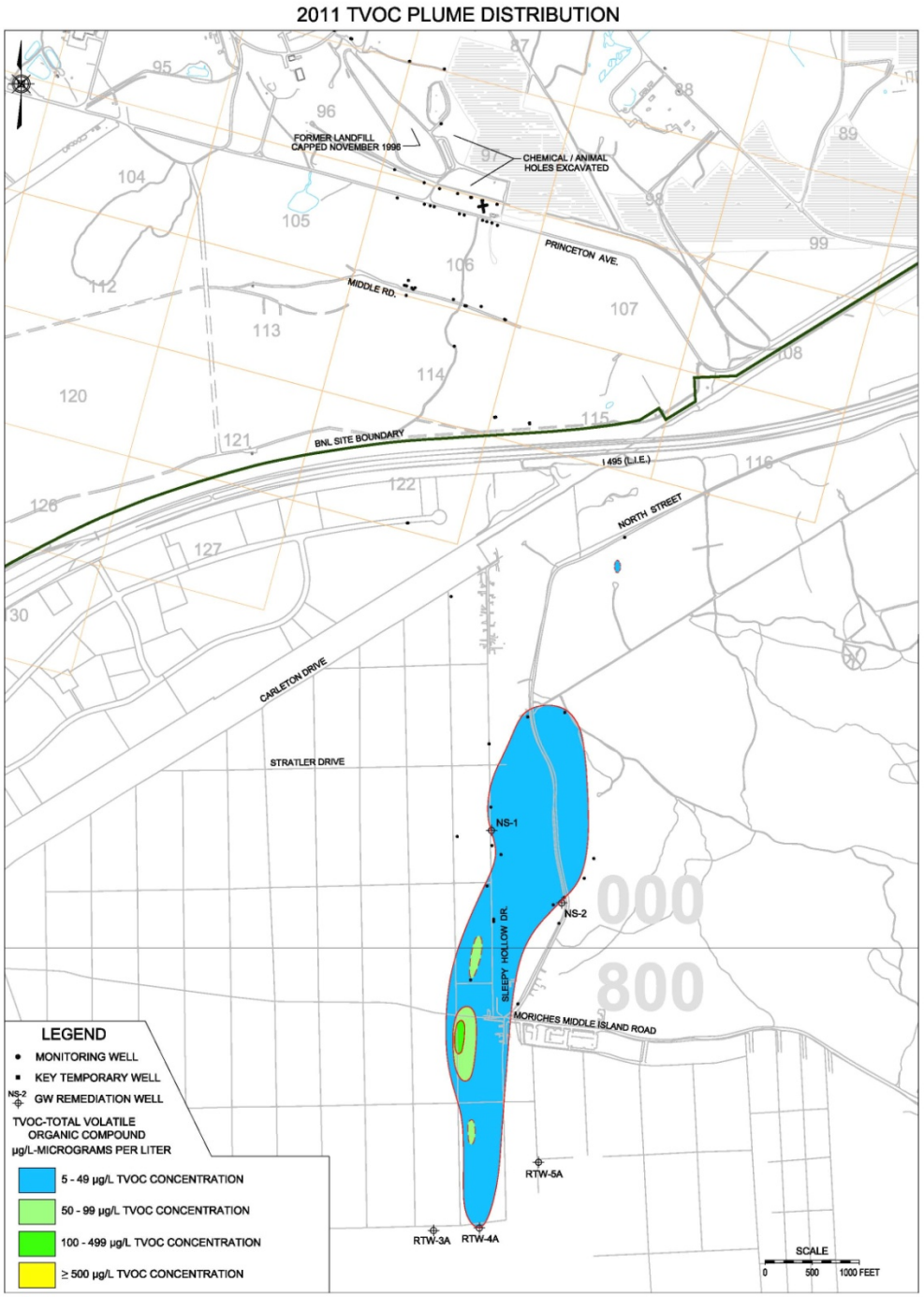
Cleanup Progress:
OU III Industrial Park East

- 2 Extraction wells, operated 2004 to 2009
- Petition for shutdown accepted and wells in standby since December 2009
- Plan to petition for closure 2013

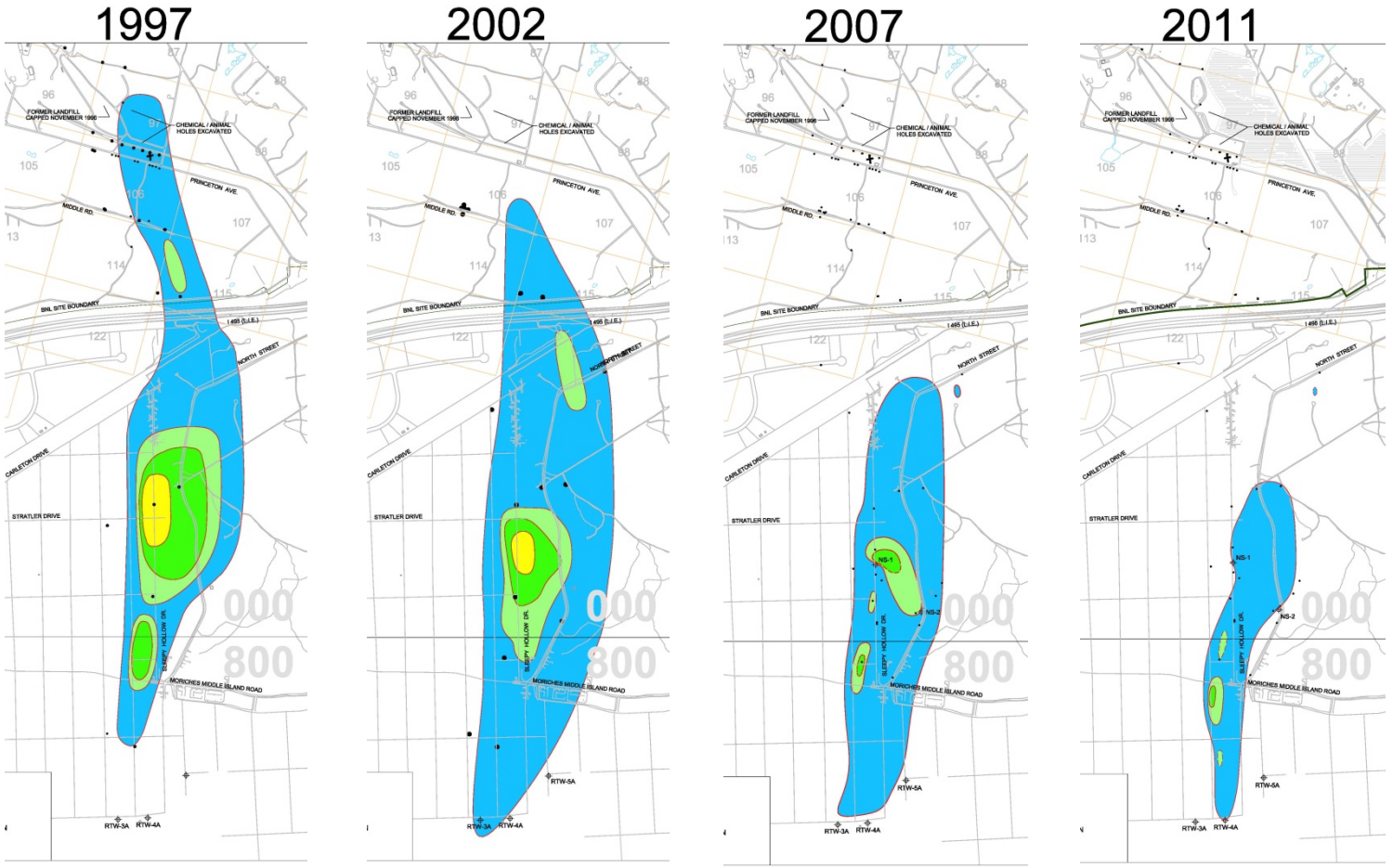


Cleanup Progress: OU III North Street

- 2 extraction wells, began operation 2004
- Extraction well NS-1 pulse pumping since May 2011
- Plan to petition for shutdown 2013

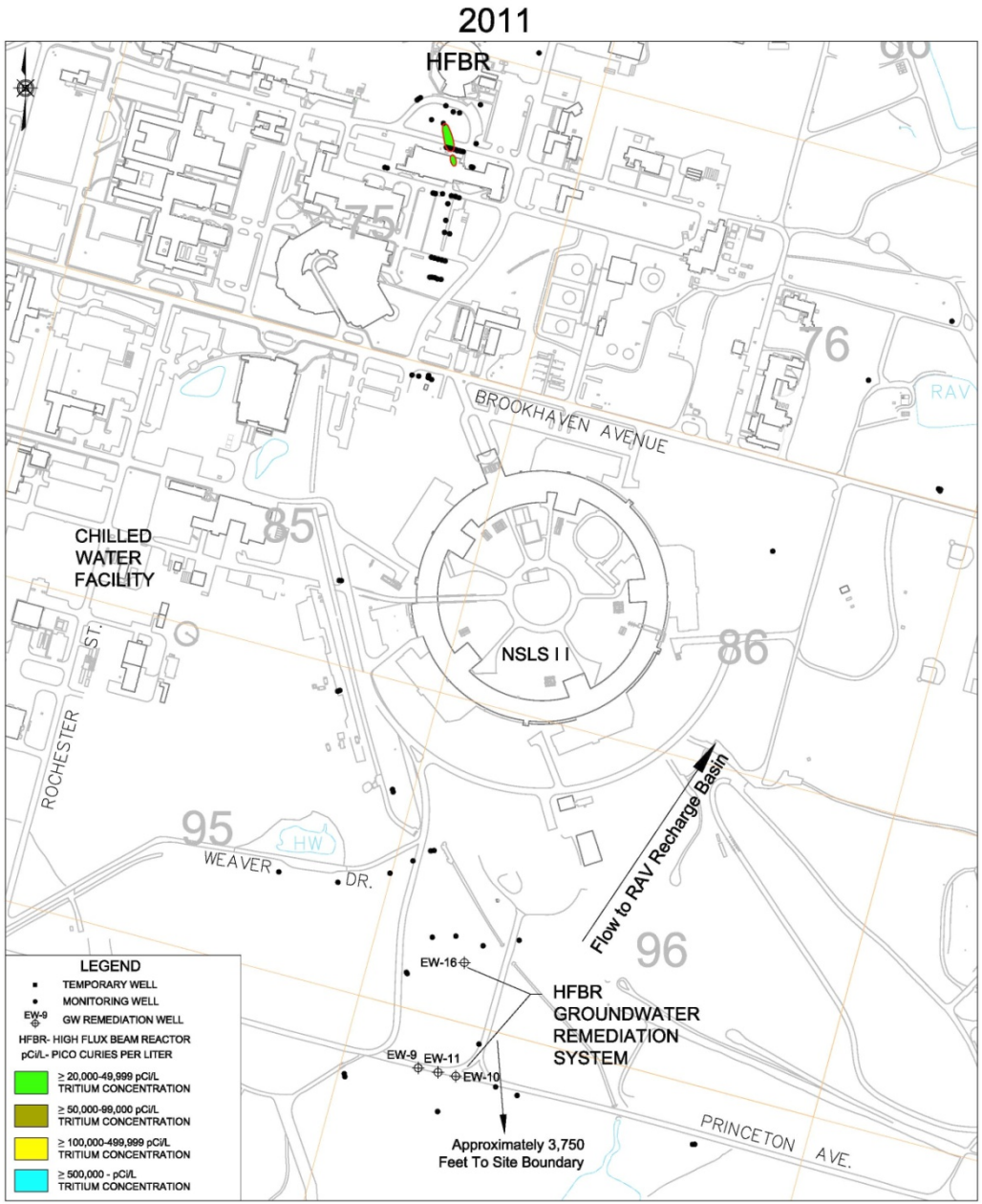


Treatment System Progress: North Street

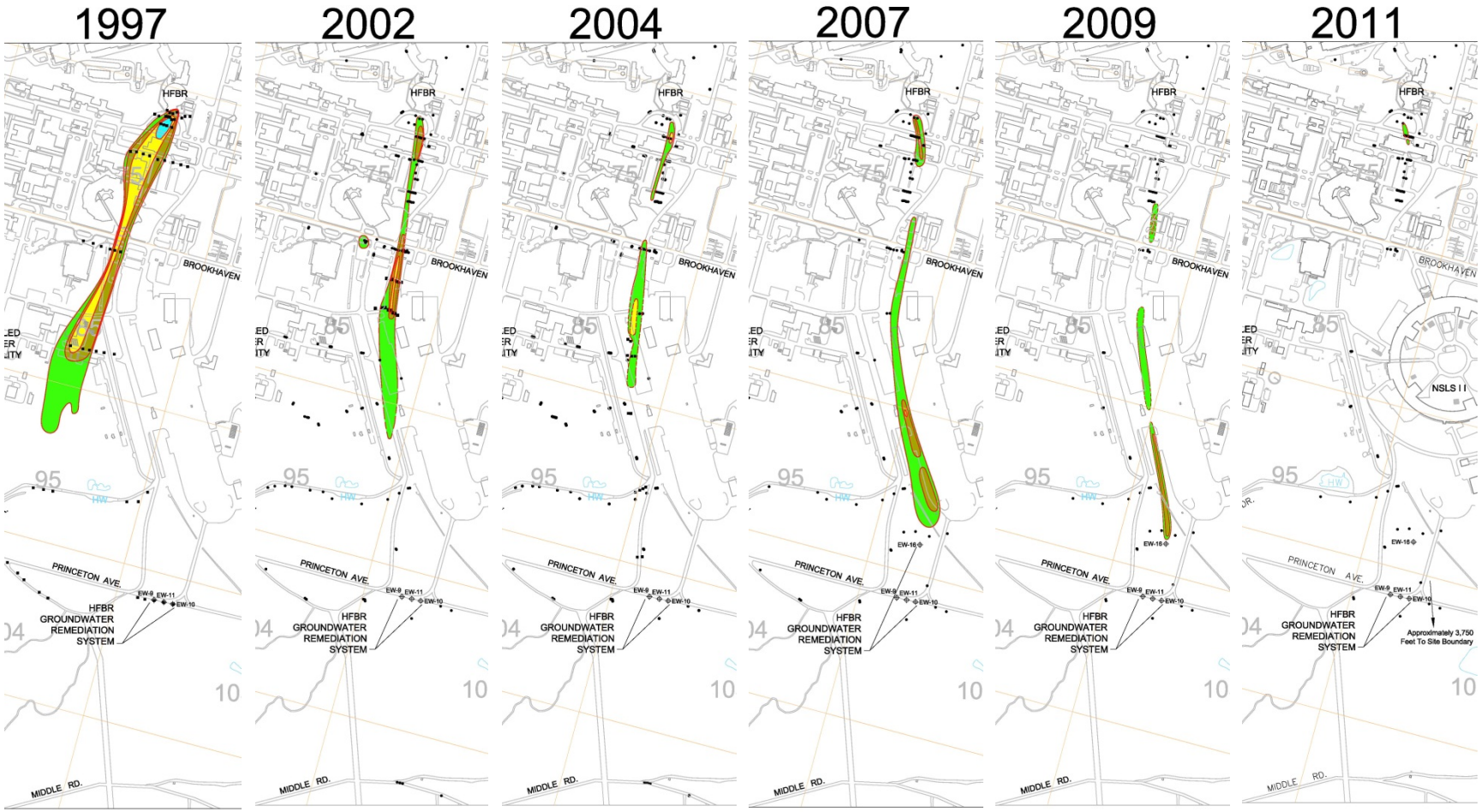


Cleanup Progress: HFBR Tritium Pump and Recharge

- Pump and Recharge System restarted November 2007
- Met criteria for placing system back in standby November 2012 (all downgradient tritium concentrations <20,000 pCi/L)

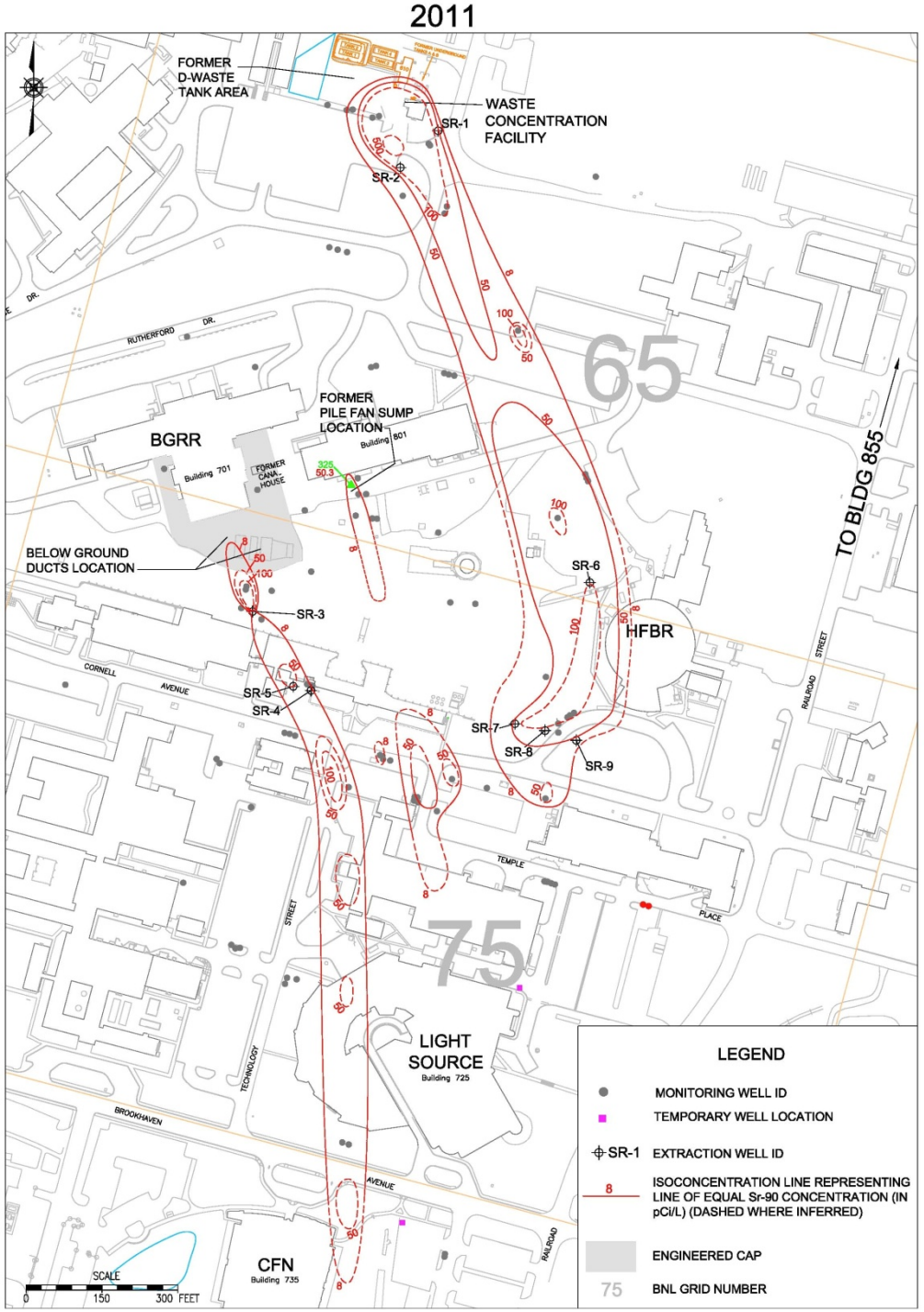


Treatment System Progress: HFBR



Status Update: BGRR Sr-90 System

- 4 extraction wells installed in 2010 operating as designed
- No significant changes to plumes
- Evaluating BGRR source area in 2013



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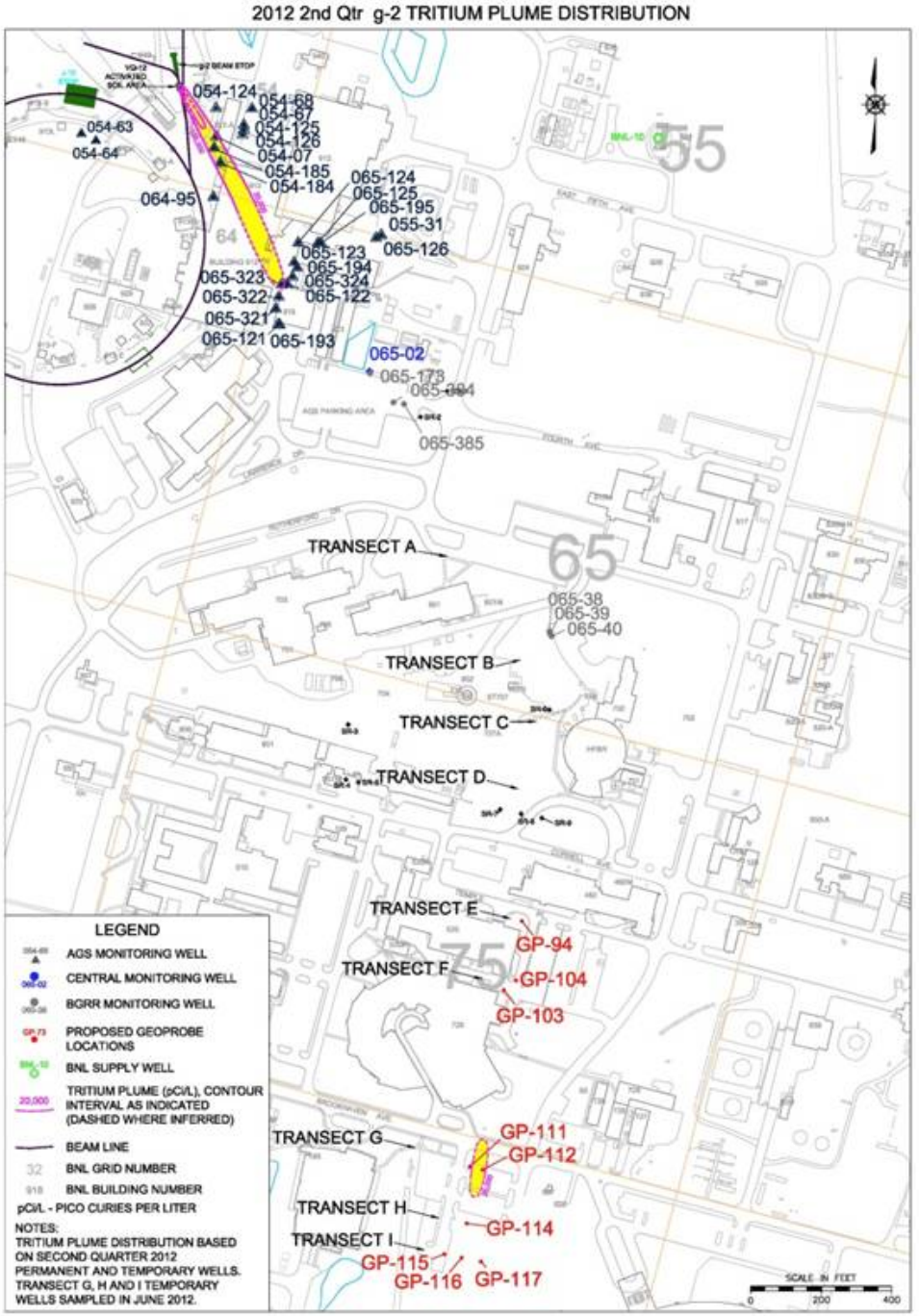
Status Update: g-2 Tritium Plume

Source Area Plume Segment

- **Tritium continues to be detected >20,000 pCi/L drinking water standard**
  - Maximum concentration in October 2012 was 34,700 pCi/L
    - Significant reduction from 3,400,000 pCi/L detected in 2002
- Continue to maintain source area cap

Downgradient Plume Segment

- **Small plume segment is located south of Brookhaven Avenue**
  - Maximum concentration in June 2012 was 33,500 pCi/L
  - Expected to naturally attenuate to <20,000 pCi/L within a short time



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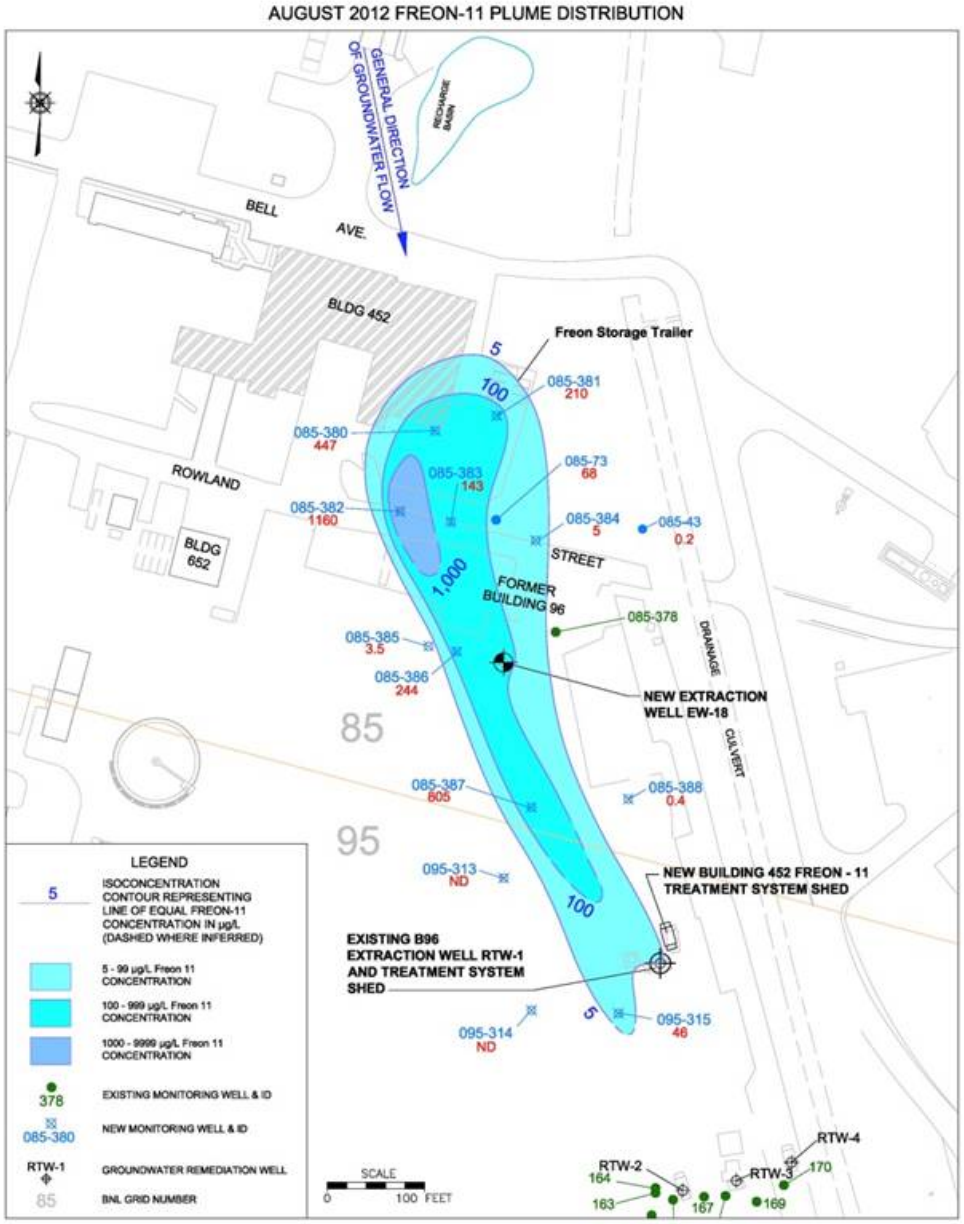
Status Update: Bldg. 452 Freon-11

Groundwater Treatment System

- **New extraction well has been in continuous operation since March 2012**
- **Highly effective in remediating plume**
- **Freon-11 concentrations in source area wells are now <1,200 µg/L**
  - Significant reduction from 37,000 µg/L detected in 2011 plume characterization



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Summary

- Making good progress in remediating groundwater
  - On target to achieving cleanup goals.
- Plume remediation is a dynamic process
  - Ongoing modifications and proposed changes are reviewed by the regulatory agencies
- Continue to keep regulators and community stakeholders informed about cleanup progress, issues and results of 2013 planned activities